

ABSTRACT OF THE DISCLOSURE

A method is disclosed for directly preparing alkali metal aluminum hydrides such as NaAlH_4 and Na_3AlH_6 from either the alkali metal or its hydride, and

5 aluminum. The hydride thus prepared is doped with a small portion of a transition metal catalyst compound, such as TiCl_3 , TiF_3 , or a mixture of these materials, in order to render them reversibly hydridable. The process provides for mechanically mixing the dry reagents under an inert atmosphere followed by charging the mixed materials with high pressure hydrogen while heating the mixture to about 125°C .

10 The method is relatively simple and inexpensive and provides reversible hydride compounds which are free of the usual contamination introduced by prior art wet chemical methods.